BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF THE ESTABLISHMENT OF AN AREA OF DRILLING CONCERN FOR THE AREA OF THE BUNKER HILL SUPERFUND SITE SHOSHONE COUNTY, IDAHO	)))))	**ORDER**

This matter came before the Idaho Department of Water Resources, in the form of a request by the U.S. Environmental Protection Agency, Idaho Department of Health and Welfare, Division of Environmental Quality and Panhandle Health District for the Department to declare an Area of Drilling Concern to control drilling activity in a Superfund area for the protection of public health and the reduction of contamination potential of the lower aquifer by newly constructed wells. The Department finds, concludes and orders as follows:

FINDING OF FACT

1. Bunker Hill Superfund site, located in the northern Idaho panhandle, 40 miles east of Coeur d'Alene, Idaho, covers approximately 21 square miles. The Bunker Hill area has moderate human activity and a history of heavy lead, zinc, and silver mining and smelting which has since ceased. These mining and smelting activities produced large amounts of tailings and mine and metals processing wastes that have accumulated in the main valley floor and some tributary gulches. These wastes have a negative impact on the valley aquifers through leaching. Communities located within the Superfund boundaries include Elizabeth Park, Ross Ranch, Kellogg, Wardner, Smelterville, Page, and Pinehurst.

2. The valley sedimentary fill consists of alluvial, colluvial and lacustrine deposits and has three major hydrostratigraphic units: 1) an unconfined upper alluvial zone and 2) a middle lacustrine confining zone and 3) a lower confined alluvial zone. Precambrian metamorphic. rock underlies the main valley aquifer system and appears near the surface or exposed on hillsides surrounding the valley. At the east end of the site near Kellogg the confining zone appears to "pinch-out" or end, resulting in a single unconfined aquifer east of this point.

3. A downward vertical ground water gradient occurs east of a line that transect the valley near Government Gulch and also in a small area near Smelterville. West of this line the ground water has an upward vertical gradient. The general ground water flow within the main valley aquifer is from east to west except in some localized areas.

4. Ground water communication across the confining zone between the upper and lower alluvial zones, if any, may occur from leakage through wells connecting both upper and lower zones, flow directly across the confining layer through discontinuities or near valley walls where a confining layer is not present.

5. Tailings and mine wastes have accumulated on the valley floor and some major tributaries where degradation of the water resource has occurred. Present in the tailings and wastes are metals ,non-metal ions and metalloids, which have infiltrated the shallow unconfined aquifer to levels of concentration higher than those considered safe by EPA Public Drinking Water Standards (PDWS). EPA PDWS concentration levels have also been exceeded by some metals and non-metal ions in the lower zone. Analytes of concern for the valley aquifer system include four metals (cadmium, cobalt, lead, zinc), one metalloid (arsenic) and five non-metal ions (fluoride, phosphate, potassium, nitrate and sulfate). A possible mode of transport of contaminates to the lower aquifer is through unused unabandoned wells in areas of downward hydraulic gradient. Ground water quality is expected to **be good in tributary** gulches where mining activity did not occur.

6. The upper unconfined aquifer varies in thickness from 10 to 40 feet and consists of alluvial deposits with intermixed jig tailings and an organic silt layer present in some areas that is believed to be the original ground surface layer prior to tailings deposition. Jig tailings are mine tailings that were deposited on the main valley floor and tributary gulches. These tailings have been mixed with alluvium and redistributed throughout most of the valley floor by flood and man-made processes. The confining layer is lacustrine in origin and is from 0-50 feet in thickness while the lower zone is unconsolidated alluvium and is from 0-50 feet thick. All layers appear to pinch out at or near valley walls where they are believed to contact buried colluvium and weathered bedrock.

7. Within the Bunker Hill boundaries are inactive tailings impoundments which were constructed to keep mine wastes from moving downstream. This has led to an accumulation of mining wastes within the site. These impoundments include sites such as the Central Impoundment Area, Page Pond and a failed plank and piling tailings dam located in the South Fork Coeur d'Alene valley.

8. Wells to be constructed, abandoned or modified within the Bunker Hill Area of Drilling Concern will require plans and specifications to be prepared by a licensed engineer or licensed geologist and will include a specified order of operation with the following information: date work will commence, representative doing the work, type of work that will be done and how it will be accomplished. It shall also include lithology and static water level expected to be encountered along with a

detailed drawing of the well bore and well construction. These documents must show that the work, if implemented, will prevent the movement of contaminates into better quality water of the lower confined aquifer. Department of Water Resources review and approval of the plans and specifications will be required before work can commence. If minimum standards for construction are not followed, certain wells may potentially continue to be a direct conduit for movement of contaminates into the lower aquifer. This could increase lower aquifer contamination thereby reducing the quality of a major source of potable water for the South Fork Coeur d'Alene valley residents.

9. The potential avenues for lower aquifer contamination associated with well construction are: 1) setting perforated casing or screen in both shallow and deeper aquifers and 2) not adequately sealing the annular space between the casing and the wall of the hole to prevent vertical water movement. Both of these practices breach the integrity of the clay and silt strata which form the natural barriers to the vertical movement of fluids in the subsurface. The former practice, under certain conditions, allows shallower contaminated waters to 'cascade' **down into the** well and flow out into the lower aquifer. The improper well seals can also provide a conduit for shallow contaminated waters to move down the well annulus into the lower aquifer. Well casing may also have corroded having been in the ground for many years which would allow for the movement of water from upper to lower aquifers.

CONCLUSIONS OF LAW

1. Idaho Code 42-238(4) directs the water resources board to adopt minimum standards for water well construction, low temperature geothermal resource well construction and geothermal well construction in this state under the provisions of chapter 52, title 67, Idaho Code. Such standards shall require each well so constructed as to protect the ground water of the state from waste and contamination and may include additional requirements for wells drilled in 'areas of drilling concern' as designated in accordance with subsection (7) of this section. Every licensed well driller will be furnished a copy of the adopted standards by the director of the department of water resources, and will be required to construct each well drilled after July 1, 1987, in compliance with the adopted standards.

2. Idaho Code 42-238(7) Drilling in a designated "area of drilling concern". The director of the department of water resources may designate as he determines necessary, "areas of drilling concern" on an aquifer by aquifer basis within which drillers must comply with the additional requirements of this section. The director shall designate "areas of drilling concern" to protect public health and to prevent waste or contamination of

ground or surface water because of factors such as aquifer pressure, vertical depth of the aquifer, warm or hot ground water, or contaminated ground or surface waters. It is unlawful for any person not meeting the requirements of this subsection to drill a well for any purpose in a designated "area of drilling concern". Any person drilling a new well or deepening or *modifying an existing well for any purpose in an "area of* drilling concern" as designated by the director as herein provided shall comply with the following additional requirements:

(a) Additional bonding requirements, as determined by the director, to insure that the well is constructed or abandoned in compliance with the adopted standards for well construction.

(b) Additional experience and knowledge in drilling wells encountering warm water or pressurized aquifers as required by rules and regulations adopted by the water resource board.

(c) Document that specialized equipment needed to drill wells in "areas of drilling concern,". as determined by the director, is or will be available to the driller.

(d) Provide a notice of intent to drill, deepen or modify a well, submit plans and specifications for the well and a description of the drilling methods that will be used, as required by the director, and receive the written approval of the director before commencing to drill, deepen, or modify any well in a designated "area of drilling concern".

Prior to designating an "area of drilling concern," the director shall conduct a public hearing in or near the area to determine the public interest concerning the designation. Notice of the hearing shall be published in two (2) consecutive weekly issues of a newspaper of general circulation in the area prior to the date set for hearing.

In the event an area has been designated as an "area of drilling concern" and the director of the department of water resources desires to remove such designation or modify the boundaries thereof, he shall likewise conduct a public hearing following similar publication of notice prior to taking such action.

3. IDWR Well Construction Standards Rule 040.01.b. promulgated under Section 42-238, Idaho Code provides "the designation of an area of drilling concern does not supersede or preclude designation of part or all of an area as a Critical Ground Water Management Area (Section 42-233a, Idaho Code), or a Ground Water Management Area (Section 42-233b)."

4. IDWR Well Construction Standards Rule 040.01.c. promulgated under Section 42-238, Idaho Code provides "the designation of an area of drilling concern can include certain aquifers or portion thereof while excluding others."

5. IDWR Well Construction Standards Rule 010.30. promulgated under section 42-238, Idaho Code states a well is defined as artificial excavation or opening in the ground more

than eighteen (18) feet in vertical depth below land surface by which ground water of any temperature is sought or obtained.

ORDER

IT IS, THEREFORE, HEREBY ORDERED that drilling, abandoning, or modification of a ground water well for any purpose within the Area of Drilling Concern hereby designated will be permitted only on a case-by-case basis upon showing by the applicant and a determination by the Department of Water Resources that the proposed well will not increase the potential for contamination to the lower aquifer by surface water or interzonal leakage.

This case-by-case examination will be limited to the following areas and procedures:

1) The Bunker Hill Area of Drilling Concern encompasses an area of approximately 30 square miles and includes all of the land within the following described boundary:

> beginning at a point on the township line that separates Range 2 East and 1 East starting at the northwest corner of section 30, Township 49N, Range 2E and running south to the southwest corner of section 7, Township 48N, Range 2E, thence east along the section lines to the southeast corner of section 9, Township 48N, Range 3E, thence north along the section lines to the northeast corner of section 33, Township 49N, Range 3E, thence west along the section lines to the northwest corner of section 33, Township 49N, Range 2E, thence north along the section line to the northeast corner of section 29, Township 49N, Range 2E, and thence west along the section line to the original starting point of the northwest corner of section 30, Township 49N, Range 2E. A map detailing the Bunker Hill Area of Drilling Concern boundaries is attached to this Order as Attachment.l.

2) Any person considering drilling, abandoning or modifying a well within the Area of Drilling Concern must submit to the Department of Water Resources plans and specifications prepared by a licensed engineer or licensed geologist and also include a map showing the location of the proposed well prior to approval of a permit.

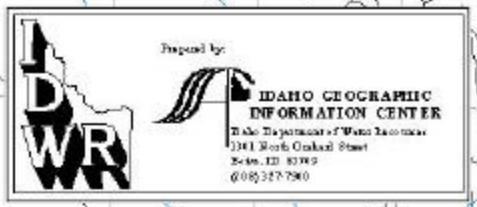
3) All drillers operating or who intend to drill, abandon, or modify wells in this Area of Drilling Concern are required to file with the Director of Water Resources a minimum bond of $10,000. The driller must show the department that the driller has the ability and the equipment necessary to construct wells with the designated overbore and to grout from the bottom of the casing to the surface to effect a thorough seal. Prior to

drilling, the driller must have an on-site inspection of the drilling equipment conducted by an IDWR inspector.

Dated this 3RD day of JUNE, 1994.

R. KEITH HIGGINSON, Director
Idaho Department of Water Resources

Bunker Hill Area of Drilling Concern



T49N

T48N

R2E

R3E

N

Coeur d'Alene River

Enaville

Cataldo

Bear Creek

South Fork Coeur d'Alene River

90

Pinehurst

Smelterville

Kellogg

Montgomery Creek

Pine Creek

Wardner

Big Creek

1 0 1 2 3 Miles

Bunker Hill ADC boundary

Includes all of the following sections: T49N, R2E, Sections 29 through 36;
T49N, R3E, Sections 31 through 33;
T48N, R2E, Sections 1 through 12;
T48N, R3E, Sections 4 through 9.

Established the 3rd day of June, 1994.